

[0088] FIG. 8 is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention. FIG. 8 comprises a system 800, which is similar to system 500 above. As shown in FIG. 8, messaging device 802 comprises a display 816 positioned underneath a touch-sensitive interface. In some embodiments (not shown in FIG. 8), system 800 may further comprise a manipulandum, such as a mouse, scroll wheel, or roller ball, which allows the user to interact with the graphical user interface on display 816.

[0089] As shown in FIG. 8, display 816 comprises folders 804, 806, 808, and 810, each of which contains files on messaging device 802's hard drive. As shown in FIG. 8, folders 806 and 808 both comprise a texture, while folder 804 and 810 do not comprise a texture. In some embodiments, the user may create additional folders and assign textures to those folders. In other embodiments, the user may remove folders. Thus, many combinations of folders, with or without textures, are possible. In some embodiments, folders 804, 806, 808, and 810 may comprise icons with links to applications that may be run on messaging device 802.

[0090] Messaging device 802 further comprises an actuator (not shown in FIG. 8) configured to output a haptic effect configured to simulate a texture. In some embodiments, the user can feel this texture on the surface of display 816. For example, in some embodiments, when the user touches the section of display 816 associated with folder 806 the actuator may output a haptic effect configured to simulate a texture. In such an embodiment, the actuator may not output a texture when the user touches the section of display 816 associated with folder 804. Further, in such an embodiment, when the user touches the section of display 816 associated with folder 808 the actuator may output a different haptic effect configured to simulate a different texture. In some embodiments, the actuator may be configured to output a different texture when the user interacts with the other sections of display 816 that are not associated with one of folders 804, 806, 808, or 810. Such an embodiment may allow the user to quickly determine which folder he/she is touching without looking at display 816.

[0091] In some embodiments, messaging device 802 may determine the texture based on the files associated with the folder. For example, in some embodiments, folder 808 may comprise audio files. In such an embodiment, messaging device 802 may determine the texture based on the type of audio files, for example a course texture if the files are hard rock, and a soft texture if the files are classical. In another example, messaging device may determine the texture based on the properties of the files in the folder. For example, folder 806 may comprise protected or read only files, while folder 808 may comprise modifiable audio files. In such an embodiment, messaging device 802 may determine a course texture when the user interacts with folder 806, and a gentle or soft texture when the user interacts with folder 808. In other embodiments, different factors associated with the folders may be used to determine the haptic effect, for example, folder size, contents of the folder, age of the folder, title of the folder, creator of the files or folder, or some other factor known in the art. In some embodiments, messaging device 802 may comprise more than one actuator, as described herein in relation to system 500.

[0092] FIG. 9 is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention. FIG. 9 comprises a

system 900, which is similar to system 500 above. As shown in FIG. 9, messaging device 902 comprises a display 916 positioned underneath a touch-sensitive interface. In some embodiments (not shown in FIG. 9), system 900 may further comprise a manipulandum, such as a mouse, scroll wheel, or roller ball, which allows the user to interact with the graphical user interface on display 916.

[0093] As shown in FIG. 9, display 916 comprises a two-dimensional rendering of a three-dimensional object 904. One side of three dimension object 904 comprises a textured side 906. In other embodiments, three-dimensional object 904 may comprise a different shape. In some embodiments, the user may draw an object with a different shape in a computer aided design program, for example a sphere or a triangle. Further, in other embodiments the user may assign textures to additional sides of three-dimension object 904. In still other embodiments, display 916 may comprise multiple three-dimensional objects with multiple combinations of textured sides. For example, in some embodiments, display 916 may comprise multiple views of three-dimensional object 904. In such an embodiment, each of the views may comprise a different texture.

[0094] Messaging device 902 further comprises an actuator (not shown in FIG. 9) configured to output a haptic effect configured to simulate a texture. In some embodiments, the user can feel this texture on the surface of display 916. For example, in some embodiments, when the user touches the section of display 916 associated with textured side 906 the actuator may output a haptic effect configured to simulate a texture. In such an embodiment, the actuator may not output a texture when the user touches other sections of three-dimensional object 904. In other embodiments, the actuator may be configured to output a different texture when the user interacts with sections of display 916 that are not associated with three-dimensional object 904. In still other embodiments, messaging device 902 may output a texture when the user rotates or moves three-dimensional object 904. Such an embodiment may allow the user to quickly determine which view of three-dimensional object 904 is shown on display 916, without looking at display 916. In some embodiments, messaging device 902 may comprise more than one actuator, as described herein in relation to system 500.

[0095] FIG. 10 is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention. FIG. 10 comprises a system 1000, which is similar to system 500 above. As shown in FIG. 10, messaging device 1002 comprises a display 1016 positioned underneath a touch-sensitive interface. In some embodiments (not shown in FIG. 10), system 1000 may further comprise a manipulandum, such as a mouse, scroll wheel, or roller ball, which allows the user to interact with the graphical user interface on display 1016.

[0096] As shown in FIG. 10, display 1016 comprises a graphical user interface for a simple computer aided design program. Display 1016 further comprises a two-dimensional rendering of a three-dimensional object 1004. Display 1016 further comprises a line selection box 1006. Line selection box 1006 comprises three line icons 1008, 1010, and 1012, which are of increasing line thickness. In other embodiments, three-dimensional object 1004 may comprise a different shape. For example, the user may draw an object of a different shape, such as a sphere or a parallelogram. Further, in other embodiments, rather than a line selection box 1006, the computer aided design program may comprise a different box